IN THE SPECIFICATION:

On page 1, at line 3, insert the following new paragraph.

This is a divisional application of Application No. 10/021,091, filed December 19, 2001.

Please amend the paragraph starting at page 1, line 21 and ending at page 2, line 13 as follows.

There have been various studies and reports on inks for pens or other writing utensils and inks for ink-jet recording. Particularly, with regard to improvement of print quality including fluorescence intensity and coloring properties of recorded matters, various proposals have been made for, for example, coloring materials of a novel structure suitable for respective use, an ink containing a coloring material having fluorescence properties (hereinafter referred to as "fluorescent coloring material") as a main coloring material, and an ink containing a fluorescent coloring material as one of the coloring materials of the ink. Particularly, the proposals of inks as a result of paying attention to the fluorescence properties of fluorescent coloring materials have been described in prior art including Japanese Patent Application Laid-Open Nos. 8-151545, 9-132729, 10-193775, 10-298462 and 10-298467 and Japanese Patent No. ~~233038~~ 2833038, and novel recording processes and/or fluorescent coloring materials have been proposed therein.

Please amend the paragraph starting at page 3, line 14 as follows.

The coloring properties of ink on a recording medium, however, have been considered only in view of chromaticity (L*, a*, b*), i.e., a conventional measure for color. Even

when a fluorescent coloring material is used, ink is designed in view of such a conventional measure, and the fluorescence developing ability of a fluorescent coloring material is far from being fully utilized at the present state. In other ~~word~~ words, even in the above described proposals on utilization of fluorescent coloring materials, the fluorescent coloring materials are used only in view of the chromaticity (L*, a*, b*) not in view of fluorescence properties thereof, or they are used for their fluorescence ~~is aimed at~~ but ~~not at~~ without taking notice of the fluorescence developing properties thereof, i.e., the fluorescence properties at an interface of the recorded matter. Thus, these proposals ~~have~~ do not ~~been~~ fully ~~utilizing~~ utilize the fluorescent properties of ~~flurescent~~ fluorescent coloring materials.

Please amend the paragraph starting at page 5, line 1 and ending at line 16 as follows.

According to one aspect of the present invention, there is provided a recording method which comprises a step of providing an ink from a recording head to a recording medium through a gap provided between the recording head and the recording medium, the ink being supplied to the recording head from an ink tank that comprises an ink contact member and the ink contacting ~~with~~ the ink contact member, wherein the ink comprises

(i) a ~~fluorecent~~ fluorescent coloring material;

(ii) a nonionic surfactant;

(iii) a compound which is not compatible to (ii); and

(iv) a liquid medium for dissolving or dispersing (i), (ii) and (iii),

and wherein the ink contact member comprises at least one compound selected from the group consisting of ~~polyacelate~~ polyacetate and polyolefin.

Please amend the paragraph starting at page 7, line 17 and ending at line 19 as follows.

Fig. 13 is a schematic perspective view illustrating the main portion in an exemplary ink-jet printer ~~capable of installing~~ in which an ink ejection head may be installed.

Please amend the paragraph starting at page 9, line 7 and ending at line 24 as follows.

Particularly, a water-soluble ink containing a fluorescent coloring material, a nonionic surfactant, a compound incompatible with the nonionic surfactant (hereinafter referred to as a surfactant-incompatible compound) and a liquid medium to dissolve or disperse these components can provide a recorded matter, of which print quality including fluorescence intensity or coloring are enhanced and stability and reliability are excellent, especially when the ink is applied on a recording medium by ~~the~~ ink-jet recording. Further, the inventors have found that if an ink having such a composition is stored in an ink-holding member and/or in an ink container formed from a compound selected from the group consisting of polyacetates and ~~polyolefines~~ polyolefins, the ink can form images of high print quality including fluorescence intensity and coloring properties even after long storage, with no problems in recording properties by the ink-jet recording process.

Please amend the paragraph starting at page 10, line 24 and ending at page 11, line 13 as follows.

When a mechanism by which an ink can provide a recorded matter having stability and reliability with high fluorescence intensity and coloring ability is considered, usually attention is directed to how to dissolve or disperse the coloring material uniformly and in good condition in the ink, in order to enhance fluorescence and coloring ability of the recorded matter. In other words, an ink is ~~designed~~ formulated based on the investigation on how to reduce aggregation of molecules or dispersion particles of the coloring material in the ink, or how to make them small, in other words, how to raise the absorbance of the ink and maintain it at a high level. Such ~~a design of ink~~ an ink formulation aims at improvement of coloring and fluorescence properties of the coloring material by preventing aggregation of the molecules or particles of a coloring material in the ink applied onto a recording medium.

Please amend the paragraph starting at page 11, line 15 and ending at page 12, line 9 as follows.

On the other hand, the inventors of the present invention reviewed and studied the state of the ink of a large variety of recorded ~~matter (print)~~ matters (prints) formed by applying an ink onto a recording ~~medium, and a large variety of recorded matters in the world~~ medium. As a result, first the inventors noted ~~a fact~~ that in any recorded ~~matters~~ matter, ~~there should be two interfaces in~~ the ink on the recording ~~medium,~~ medium has two interfaces: one ~~is~~ between the recording medium and the ink, though it may not be sharp, and the other ~~is~~ between the ink and the atmosphere. Next, the inventors noted ~~the fact~~ that when recording is conducted on, for

example, wood-free paper with increased ink permeability, the apparent coloring ability of a coloring material tends to decrease, and that when recording is conducted on a ~~back-coated~~ back-coated film or when the recorded matter is laminated, the apparent coloring of the coloring material is improved. On the basis of the above ~~fact~~, investigation was carried out considering how to create an interface state that enhances the coloring of the coloring material between the ink on the recording medium and the atmosphere after recording, and how to maintain the interface state, to complete the recording process of the present invention.

Please amend the paragraph starting at page 14, line 23 and ending at page 15, line 13 as follows.

Through further investigation, the present inventors have found that water is a preferable liquid medium. More specifically, when water is used as the liquid medium, in comparison with other liquid media, a wide variety of compounds can be used to widen the selection range of constituent materials of the ~~ink, water-base~~ ink. Water-based ink does not tend to lower the quality of recorded matter recorded on ~~wood-free~~ wood-free paper in comparison with ~~non-aqueous~~ non-aqueous ink, and the aqueous medium can be removed by penetration into the wood-free paper, and ~~moreover~~ moreover, water is stable to evaporation. Use of water is thus preferred. In the recording process according to this invention, the ink is fed through a gap to a recording medium. On the other hand, when recording is conducted by applying pressure to ink in contact with the recording medium as with a ball point pen, since the ink is pushed into the recording medium, the mechanism of the present invention is ~~difficult~~ less likely to work.

Please amend the paragraph starting at page 15, line 17 and ending at page 16, line 4 as follows.

The ink constituents, the nonionic surfactant and the organic compound incompatible with the surfactant, ~~are those~~ undergo phase separation into a layered state as water and oil when only the surfactant and the surfactant-incompatible compound are mixed. Specifically, in a three-component system containing a nonionic surfactant, a compound incompatible with the surfactant and water as a solvent, the surfactant and the surfactant-incompatible compound are initially dissolved in water. When water serving as a solvent evaporates in an environment of, for example, 50°C, the two compounds separate from each other. In particular, when the organic compound and the surfactant ~~are those~~ undergo liquid-liquid separation with evaporation of water, the mechanism of the present invention develops easily.

Please amend the paragraph starting at page 16, line 6 and ending at line 23 as follows.

The liquid medium usable in the present invention is selected from among a wide variety of ~~liquid~~ liquids in view of the combination of the nonionic surfactant and the surfactant-incompatible compound and its compatibility with these components. However, as described above, water is particularly preferred as the liquid medium. The ~~reason~~ reasons for using it ~~includes~~ include stability of the resulting ink, ~~problem~~ problems of print quality with non-aqueous liquid media, and ease of selection of the surfactant and the surfactant-incompatible compound. Accordingly, as a preferred embodiment of the present invention, all of the properly

usable nonionic surfactants and surfactant-incompatible compounds are water-soluble or hydrophilic materials. Also, with regard to the interface formed in the recorded part as one of the working effects of the present invention, the nonionic surfactant and the surfactant-incompatible compound are preferable in liquid state at normal temperature.

Please amend the paragraph starting at page 16, line 25 and ending at page 17, line 5 as follows.

The surfactant-incompatible compound may be any compound so far as it undergoes phase separation into a layered state as water and oil when it is mixed with a nonionic surfactant as described above. However, for example, ~~the~~ one having a solubility parameter of at least 15 and that is incompatible with a nonionic surfactant is preferred. Herein, the solubility parameter values are determined by the Fedors method.

Please amend the paragraph starting at page 17, line 7 and ending at line 14 as follows.

Preferable surfactant-incompatible compounds are those having a glycerin group. Since the glycerin group has strong hydrating force, such a compound serves easily as the ~~"water of"~~ "water" of "water and oil" as described above in the explanation of the phenomenon of the present invention. Among such compounds, monomer sugar alcohols such as glycerin, xylitol and erythritol, and dimer or trimer sugar alcohols such as diglycerin may be used.

Please amend the paragraph starting at page 17, line 16 and ending at line 25 as

follows.

Further, the above compounds can be addition products of ethylene oxide, propylene oxide or a combination thereof. Among these, those having at least three hydroxyl groups and ~~being~~ that are liquid at normal temperature are particularly preferred. The content of these compounds in the ink is preferably controlled to 1.0 to 30 % by weight, particularly 5.0 to 20 % by weight based on the total weight of the ink. However, the present invention is not limited thereto depending on the recording medium used.

Please amend the paragraph starting at page 18, line 17 and ending at page 19, line 4 as follows.

Among nonionic surfactants those having an HLB of not more than 13 may preferably be used in the present invention. In general, those having an HLB exceeding 13 become too hydrophilic making it difficult ~~to occur~~ for phase separation to occur in the ink on the recording medium when an image is formed, which may prevent the working effect of the present invention that interfaces formed with ink components in the ink on the recorded medium enhance the color/fluorescence development. In the case of organic compounds having a solubility parameter of not less than 15, especially, it is preferable to use a nonionic surfactant having a solubility parameter of not more than 13. If these solubility parameter values are too close, the working effect of the present invention may not be achieved due to high compatibility of both components.

Please amend the paragraph starting at page 23, line 3 and ending at line 20 as follows.

The water-soluble or hydrophilic fluorescent coloring materials include, for example, compounds or coloring materials soluble in water by themselves (for example, fluorescence brightener and fluorescence paint), and also compounds or coloring materials apparently dissolved in water, which are inherently hydrophobic but are made hydrophilic by a ~~the~~ surface treatment and emulsified in water. However, coloring materials merely dispersed by using a resin as a dispersing agent as with a pigment dispersion, are not included. The reason for ~~it~~ this is that it is difficult for this type of coloring material ~~is hard~~ to develop the effect of the above-described mechanism, and moreover it may not be ~~said to be~~ a very preferable selection from the viewpoint of reliability of the resulting ink. All the states of the compounds exhibiting fluorescence properties and fluorescent coloring materials in a liquid medium as described above will hereinafter be represented as "dissolution" unless expressly noted.

Please amend the paragraph starting at page 23, line 22 and ending at line 25 as follows.

As the compounds exhibiting fluorescence properties and fluorescent coloring materials to be used, ~~are particularly preferred~~ those containing any of the following atomic groups are particularly preferred:

Please amend the paragraph starting at page 26, line 21 and ending at page 27, line 6 as follows.

The content of such fluorescent coloring materials as mentioned above in the ink is preferably controlled to at most 1.5 % by weight, more preferably at most 1.0 % by weight. The fluorescent coloring material has a nature that when its content in the ink exceeds a certain value, the fluorescence intensity of the ink is lowered (~~the~~ this phenomenon is referred ~~refers~~ to as concentration quenching). For this reason, the concentration quenching cannot be prevented by the above-described mechanism if the concentration exceeds 1.5 % by weight. When only the fluorescence properties are considered to be most important, it is particularly preferred that the content be at most 0.5 % by weight.

Please amend the paragraph starting at page 30, line 23 and ending at page 31, line 8 as follows.

As a compound capable of being added to the ink according to the present invention, ~~it is preferably used~~ a compound having a solubility parameter value between that of the above described nonionic surfactant and that of the surfactant-incompatible compound is preferably used. The ink having such ~~configuration represents~~ a composition shows improved stability even in the gas-liquid interface of such ink when the ink is used for the formation of images. As such a compound, especially preferable is a glycol compound in a liquid state at a normal temperature. The amount ~~Amount~~ of the compound to be used is, without limitation, preferably 0.1 to 15% by weight, more preferably 0.1 to 10% by weight based on the total weight of the ink.

Please amend the paragraph starting at page 32, line 22 and ending at page 33, line

14 as follows.

The content of the coloring material exhibiting no fluorescence properties in the inks according to this embodiment is preferably not lower than the content of the fluorescent coloring material as described above. The ink used in the present invention is made up in such a manner that a compound ~~containing~~ containing a fluorescent coloring material is caused to be suspended at the gas-liquid interface, thereby improving fluorescence properties. The fluorescent coloring material can not be added in the ink in a large amount. Even when visually observing a printed matter and having lost fluorescence properties by contact of the recorded matter with water, this well maintains the recorded condition and prevents completely loss of the details recorded. However, when the coloring material exhibiting no fluorescence properties is selected, it is preferable that it be suitably selected according to the developed state of fluorescence properties in a recorded matter formed with the fluorescent coloring material, or balance with the coloring ability thereof.

Please amend the paragraph starting at page 51, line 10 and ending at line 23 as follows.

With regard to a recording method according to the present invention, the ink comprising the components described above is stored in an ink container formed from a compound selected from the group consisting of polyacetates and ~~polyolefines~~ polyolefins, or in an ink container containing an ink-holding member formed from such a compound, and then the ink is fed to a recording member through a gap. Particularly, an ink-holding member made of polypropylene, as one of polyolefins or condensed compounds such as polypropylene fibers, is

preferably used. In addition, the ink-holding member formed from such a material as described above may preferably be porous, multi-layered and/or fibrous aggregate.

Please amend the paragraph starting at page 51, line 24 and ending at page 52, line 7 as follows.

For example, a compound selected from the group consisting of polyacetates and ~~polyolefines~~ polyolefins generally shows a high stability to the influence of pH value, water and organic solvents. As a result of studying the stability by the present inventors, it was confirmed that the ink used in the present invention has favorable properties which are not deteriorated even if the ink is retained in a specific ink-holding member and/or ink receiving member formed from such a material for a long time, to thereby maintain stably an excellent reliability when the ink is used in the formation of images.

Please amend the paragraph starting at page 53, line 3 and ending at line 17 as follows.

Ink-jet recording methods include a recording method in which mechanical energy is applied to an ink to eject droplets of the ink, and a recording method in which thermal energy is applied to an ink to eject droplets of the ink by bubbling of the ink. The inks according to the present invention are particularly suitable for use in an ink-jet recording method of a type that an ink is ejected by the bubbling phenomenon of the ink caused by thermal energy. In the case of an ~~the~~ ink-jet recording method of this type, the ejection of the ink becomes extremely stable, and no satellite dots are generated. In some ~~case~~ cases, however, the thermal properties (for example,

specific heat, coefficient of thermal expansion, heat conductivity, etc.) of the inks may be controlled.

Please amend the paragraph starting at page 53, line 19 and ending at page 54, line 4 as follows.

From the viewpoint of ~~making~~ improving the matching of the inks with an ink-jet head ~~good~~, the inks according to the invention may desirably be controlled so as to have, as their own physical properties at 25 °C, a surface tension of 30 to 40 mN/m (dyn/cm) and a viscosity of 15 cP or lower, preferably 10 cP or lower, more preferably 5 cP or lower. In order to control the inks to have the above physical ~~properties~~ property values to solve problems in recording on plain paper, the amount of water contained in the inks according to the invention is preferably controlled to not less than 50 % by weight, but not more than 98 % by weight, more preferably not less than 60 % by weight, but not more than 95 % by weight.

Please amend the paragraph starting at page 57, line 5 and ending at line 22 as follows.

Reference numerals 51 and 52 denote a feeding part from which the recording medium is inserted, and feed rollers driven by a motor (not illustrated), respectively. By this construction, the recording medium is fed to the position ~~opposing to~~ opposite the ejection opening face of the recording head 65 and delivered to the delivery portion provided with the delivery roller 53 as recording progresses. In the above construction, the cap 62 in the ejection-recovery portion 64 is receded from the path of motion of the recording head 65 when the

recording head 65 is returned to its home position after completion of recording, and the blade 61 remains protruded into the path of motion. As a result, the ejection opening face of the recording head 65 is wiped. When the cap 62 comes into contact with the ejection opening face of the recording head 65 to cap it, the cap 62 is moved so as to protrude into the path of motion of the recording head 65.

Please amend the paragraph starting at page 58, line 11 and ending at line 26 as follows.

Fig. 5 illustrates an exemplary ink cartridge 45 in which an ink to be fed to a head through a member for feeding the ink, for example, a tube is contained. Here, reference numeral 40 designates an ink container containing the ink to be fed, as exemplified by a bag for ink. One end thereof is provided with a stopper 42 made of rubber. A needle (not illustrated) may be inserted into this stopper 42 so that the ink in the bag 40 for ink can be fed to the head. Reference numeral 44 indicates an ink absorbing member for receiving a waste ink. The ink container in the present invention is formed from a compound selected from the group consisting of ~~polyadetates~~ polyacetates and ~~polyolefines~~ polyolefins. It is preferred that the ink container 40 be formed of a polyolefin, in particular, polypropylene, at its surface with which the ink comes into contact.

Please amend the paragraph starting at page 59, line 14 and ending at page 60, line 7 as follows.

While polymers of inorganic compounds, polyvinyl acetate, polyolefins or the like

are commonly used as a material for the ink-holding member, but as mentioned above, in the present invention, the ink-holding member is made of those compounds selected from the group including polyvinyl acetate and polyolefins. Further, while an ink-holding member made of a porous material or having a multi-layer structure is preferably used, it is particularly preferred to use compressed fiber aggregate from the viewpoints of the ink holding properties, ink ejecting properties, and reliability. It is preferred to use an ink-holding member having a multi-layer structure or fiber aggregate of which multi-layer arrangement or the fiber arrangement in the ink container is aligned in an ink discharging direction. It is also preferred to use an ink-holding member having a contact surface with the ink container. Reference numeral 72 indicates an air passage for communicating the interior of the recording unit 70 with the atmosphere. This recording unit 70 is used in place of the recording head 65 shown in Fig. 4, and is detachably installed on the carriage 66.

Please amend the paragraph starting at page 72, line 7 and ending at line 15 as follows.

Since the ejection of the satellite droplet can be prevented as described above, splash easily occurring by the ejection of the satellite droplet can be prevented, and staining of the recording surface on the recording medium with mist ~~suspending in the form of fog~~ from the ink can be surely prevented. In Figs. 24 to 27, reference characters I_d and I_e indicate an ink attached to the groove portion (ink within the groove) and an ink remaining in the liquid flow path, respectively.

Please amend the paragraph starting at page 74, line 22 and ending at line 27 as follows.

As the pulsed driving signal, such signals as described in U.S. Patent Nos. 4,463,359 and 4,345,262 are suitable. When the conditions described in U.S. Patent No. 4,313,124, which ~~that~~ is an invention relating to the rate of temperature ~~rise f~~ rise of the heat-acting surface, are adopted, far excellent recording can be conducted.

Please amend the paragraph starting at page 77, line 19 and ending at page 76, line 10 as follows.

In addition, inks that are liquefied by applying thermal energy according to recording signals and ejected as liquid inks, such as inks ~~that~~ in which temperature rise by thermal energy is positively prevented by using the thermal energy as energy for phase change from a solid phase to a liquid phase and inks solidified in a state left to stand for the purpose of preventing evaporation of the inks, and inks of a nature that they are liquefied for the first time by thermal energy, such as those already beginning to solidify at the time they reach a recording medium, may also be applied to the present invention. In such a case, the inks may be in a form that they are ~~opposed to~~ opposite electrothermal converters in a state retained as a liquid or solid in recesses or through-holes in a porous sheet as described in Japanese Patent Application Laid-Open No. 54-56847 or 60-71260. In the present invention, the above-described film boiling system is most effective for the above-described inks.

Please amend the paragraph starting at page 78, line 12 and ending at line 19 as

follows.

Furthermore, as forms of the recording apparatus according to the present invention, forms ~~that~~ wherein the apparatus is integrally or separately provided as an image output terminal for information processing instruments such as word processors and computers, and forms such as copying machines combined with a reader and facsimiles having a transmitting-receiving function may also be adopted.

Please amend the paragraph starting at page 81, line 16 and ending at line 23 as follows.

The respective components shown in ~~Tables~~ Table 1 were mixed and thoroughly stirred into solutions or dispersions. The resultant solutions or dispersions were separately filtered under pressure through a Fluoropore Filter (trade name; product of Sumitomo Electric Industries, Ltd.) having a pore size of 0.1 μm, thereby preparing inks Nos.1-8 to be used in Examples and ~~Preparation~~ Comparative Examples.

Please amend the Table 1 starting at page 82, line 1 and ending at line 23 as follows.

TABLE 1 : COMPOSITION OF COMPONENTS IN INK USED IN EXAMPLES and COMPARATIVE EXAMPLES

		Ink No.							
		1	2	3	4	5	6	7	8
Fluorescent compound (coloring material)	C.I. Acid Red 52	0.2	0.3	0.3	0.2	0.3	0.25	0.4	0.25
	C.I. Acid Red 92					0.5			

	C.I. Solvent Yellow 7					0.1			
Non-fluorescent coloring material	Exemplified coloring material(11)		0.4				0.2		0.5
	Exemplified coloring material(2)				0.25				
	C.I.Direct Red 80	0.01							0.01
Surfactant	Sarfinol 440(HLB=8)			0.1					
	Sarfinol 465(HLB=13)	2	1	1.5	1	1	2		1.5
	Exemplified compound(V)				1			1.1	
Incompatible compound	Glycerin	10	10	8			10	10	8
	Glycerin (dimer)				5		5		
	Xylitol					5			
Organic solvent	Triethylene glycol	10		8	10	10			8
	Tripropylene glycol				5				
Others	Urea			8		5			8
	Triethanolamine					3			
	Isopropyl alcohol			4	4	3			4
	pure water	bal-ance	bal-ance	bal-ance	bal-ance	bal-ance	bal-ance	bal-ance	~~Bal-ance~~ bal-ance

Please amend the paragraph starting at page 83, line 20 and ending at page 84, line 3 as follows.

Each of the resultant inks Nos.1-8 having the corresponding compositions shown in Table 1 was charged into an ink tank containing the respective ink-holding member made of the above described materials within BJC 400J in a predetermined amount to record ~~alphameric~~ alphanumeric characters on commercially available wood-free paper until the ink of the ink tank ~~become~~ became exhausted. After recording, recorded matters obtained at the first and last times of recording were compared with each other to visually evaluate the ink in accordance with the following standard:

Please amend the paragraph starting at page 87, line 14 and ending at line 26 as follows.

As described above, there is provided an ink which can provide a recorded matter to the recorded portion of which, for example, fluorescence properties important for colors ~~of the natural kingdom~~ in nature are sufficiently imparted fully making good use of the fluorescence properties of the ink and which has high fluorescence intensity and is excellent in print quality including coloring ability, said ink being capable of enhancing the reliability of the recorded matter including the preservation ability and the discharging ability, whereby a recording method and an ink-cartridge suitable for executing said method are provided to improve the stability and reliability of recorded matters.